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## Table of Contents

<i>Using Predictive Analytics to Identify First-Year Engineering Students at Risk of Failing Engineering Physics</i> Low Beng Yew Cha Cher Liang Teoh Cheng Yong	pp. 1 - 11
<i>Preparing Teachers for Rural Schools in Indonesia: A Case Study of Teachers' Professional Development Program</i> Munawwarah	pp. 13 - 27
<i>Physics Teachers' Conception of a Supportive Learning Environment</i> Kim P. Diate Ivy Claire V. Mordeno Amelia T. Buan Elesar V. Malicoban Neal Alfie Y. Lasta	pp. 29 - 41
<i>The Effect of Gender and Learning Styles on L2 Learners' Writing Performance at Higher Education</i> Sabarun Hamidah Marsiah	pp. 43 - 53
<i>Technology Integration: Implication for Teachers' Professional Development</i> Lian Krizzia G. Rosales	pp. 55 - 68
<i>A Within-Asia Comparison in English Language Classroom Anxiety</i> Hiromi Oda Jatrifia Sinatrya Uyun Nishar Andrew Foong Naoko Ichii	pp. 69 - 84
<i>Design Thinking Applied to Advertising Design Courses to Enhance Students' Learning Achievement</i> Fang Ching-Jung	pp. 85 - 98
<i>Stories and Experiences in the Time of Pandemic: Online Conversations of Filipino Student Affairs and Services Practitioners</i> Leandro A. Loyola	pp. 99 - 112
<i>A Critical Analysis of Prevention Science Framework: An Examination of Student Discipline Programs</i> Diana Genevive H. Layag	pp. 113 - 125

*The Relationship between Intercultural Communication Competence and Perceived Challenges and Its Effect on the Perceived Success of International Students in Japan*

Yinghui Jia

Eunyoung Kim

pp. 127 - 141

*Distance Education in Hong Kong Preschools: Learning and Teaching During COVID-19 School Closures*

Anika Saxena

Rebecca Smith

Aylin Kip

pp. 143 - 159

*Maximising Student Engagement in Online and Blended Learning: A Survey of Learner Preferences*

Arturo Molina-Cristóbal

Idris Lim

Fan Hong

Christian Della

Jolly Atit Shah

Vicki Dale

Duncan Bremner

pp. 161 – 170

***Maximising Student Engagement in Online and Blended Learning:  
A Survey of Learner Preferences***

Arturo Molina-Cristóbal, University of Glasgow Singapore, Singapore  
Idris Lim, University of Glasgow Singapore, Singapore  
Fan Hong, University of Glasgow Singapore, Singapore  
Christian Della, University of Glasgow Singapore, Singapore  
Jolly Atit Shah, University of Glasgow Singapore, Singapore  
Vicki Dale, University of Glasgow, United Kingdom  
Duncan Bremner, University of Glasgow, United Kingdom

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**Abstract**

Blended learning is the integration of classroom face-to-face (F2F) learning with online learning experiences to engage students in a flexible learning framework. F2F lecturing is generally described as being more engaging. However, the incorporation of online resources gives students choice and flexibility in how they approach their studies and can offer an additional tool to further enhance and re-enforce content delivered F2F. Concepts of emotional and cognitive engagement and self-determination theory have attracted attention as a possible way to describe and influence student engagement in blended learning. A recent survey at the University of Glasgow Singapore (UGS) found that students perceive the incorporation of online resources favourably, with recommendations for 40-60% of teaching experiences to be video-based/online. It is important that the online content, format and delivery are designed to maximise student engagement. However, there is no consensus on the best format and balance between online work vs traditional F2F setting to achieve this outcome, and best practice guidelines are lacking. The objective of our study is to develop a series of pilot online resources across four engineering programmes and obtain student feedback through structured questionnaires, to identify what indicators and facilitators enhance engagement. In this paper, we present findings from the questionnaires on the learners' preferences and identify content and formats that are best received through online sources. In particular, our findings identify recorded video tutorials in combination with F2F lectures as a powerful tool to enhance student satisfaction and engagement.

Keywords: Student Engagement, Blended Learning

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## **Introduction**

### **Blended Technologies in Learning**

Higher education institutions are faced with the challenge to modify educational experiences in tandem with the rapid progress in information technologies, as well as the expectations of prospective students for higher quality blended learning experiences. In comparison with traditional face-to-face teaching, incorporation of blended learning has the potential to provide learning opportunities that allow students to engage more deeply with their subject matter and analyse and reflect at their own pace, and should not be limited to finding a new medium to deliver old content (Garrison & Kanuka, 2004). This move requires rethinking the teaching-learning relationship and will have profound yet uncertain implications on teaching practices and the way students engage with the university program.

Student engagement is the students' interaction with learning activities and has been identified as an indicator of student academic success and the institution's productivity (Coates, 2005b). Blended classes may make engagement more difficult for students, as they must navigate between instructional modalities, and need to be more proactive. It has been reported that several individual characteristics that make engagement in online settings difficult are: low self-efficacy, low resilience, low self-regulation. A blended learning approach may also diminish opportunities to interact, collaborate and receive feedback and social support (Manwaring et al., 2017). Given these concerns, it is essential to design the blended learning content to ensure that student engagement is considered from the beginning of its conception.

### **Student Engagement**

Student engagement can be divided into three dimensions (Fredricks et al., 2004): (1) Behavioural engagement, it draws on the idea of participation; it includes involvement in academic and social or extracurricular activities. (2) Emotional engagement is related to positive and negative reactions to teachers, classmates, academics, and school and influence willingness to do the work. (3) Cognitive engagement is associated with willingness to exert the effort necessary to comprehend complex ideas and master difficult skills.

The three components of student engagement are interrelated within the individual and they are not an isolated processes (Fredricks et al., 2004). Park et al., (2012) argues that "students who do not feel emotionally engaged in their academic life often begin to disengage behaviourally and cognitively as well, and ultimately are at risk for poor academic outcomes". A growing body of evidence indicates that emotional engagement positively influences cognitive engagement, or otherwise put, emotional engagement precedes cognitive engagement (Fredricks et al., 2004; Manwaring et al., 2017). Therefore, an important aspect of developing online courses will be to incorporate aspects of emotional engagement to ensure that cognitive engagement is achieved.

### **Conditions for Emotional Engagement**

Self-determination theory (SDT) by Deci & Ryan, (1985) offers a framework for understanding the conditions under which students are likely to become emotionally engaged in their work. The SDT framework has specified a set of three psychological needs that are relevant to intrinsic motivation (Deci & Ryan, 1994). These are:

- Autonomy: the need to feel ownership of one's behaviour (choice)
- Competence: the need to produce desired outcomes and to experience mastery (confidence & structure)
- Relatedness: the need to feel connected to others (social presence)

Several researchers proposed using the psychological needs specified in the SDT to identify key tenets of emotional engagement in learning (see Figure 1) (Manwaring et al., 2017; Park et al., 2012; Raes & Depaepe, 2020; Sun & Rueda, 2012). This approach is emerging as a promising methodology to study student engagement, and at present, there are limited studies that have measured these components of engagement with respect to specific components of the blended learning environments (e.g., videos, quizzes, lecture notes).

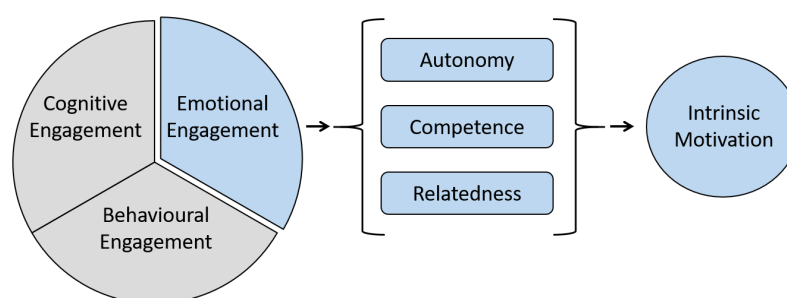


Figure 1: Dimensions of Student Engagement and Its Connection with the Self-Determination Theory Framework, Modified from (Raes & Depaepe, 2020).

### Design and Review of Online Videos

Learning management systems (LMS) platforms have become central to the delivery of blended learning in tertiary institutions (Coates, 2005a). A typical approach to designing a course is to design and upload traditional course content (e.g., lecture notes as files) to an LMS platform and make it available online for students. However, uploading content to LMS on its own is not a truly blended learning approach (Graham et al., 2013). A blended learning course should be designed such that optimally integrates face-to-face and online modes of study to engage students in a flexible learning experience.

It is not clear which format and content of the online material and the ratio of online versus F2F learning is most effective for student engagement, and best practice guidelines on how to achieve this are lacking (Delialioğlu, 2012; Manwaring et al., 2017). A qualitative study conducted at UGS by Lim Li Hong et al., (Lim Li Hong et al., 2020), which found that students were in favour of video-supplemented learning and appreciated the resulting autonomy and self-dictated pace. The majority of the students have indicated that an acceptable level of videos versus F2F lecturing is about 40-60%.

Our study aims to examine the learners' preferences and identify content and formats that are best received through online sources in blended environments. We plan to develop a series of pilot online video resources across four engineering programmes and obtain student feedback through structured questionnaires, to identify what indicators (ways to measure) and facilitators (aspects of online material) enhance engagement. We present findings from some preliminary questionnaires on the learners' preferences and identify content and formats that are best received through online sources with a view to further research aimed at measuring the impact of the resources on student engagement.

## Methodology

The objective of our study is to develop a series of online resources across four engineering programs to study components of student engagement. The online resources comprise (1) F2F & Online lectures and (2) F2F & Online tutorials. Figure 2 shows a sample of the pilot online lectures and online tutorials.

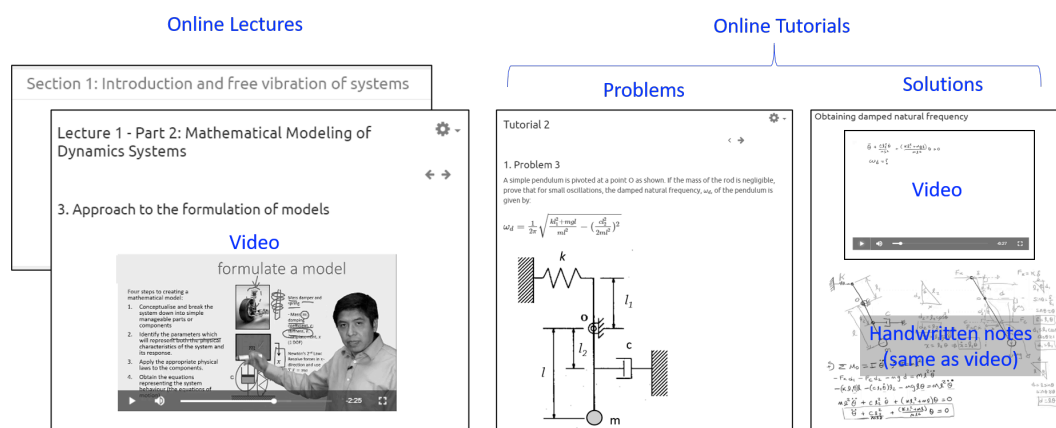


Figure 2: Sample of Online Resources

In this pilot run, we created video recordings of lectures nested within PowerPoint slides (Figure 2), PowerPoint slides with audio recordings, and step-by-step problem-based tutorials with audio recordings. These videos were created in addition to standard F2F teaching on these topics. Students were invited to view these resources and we administered questionnaires to identify, which aspects of online and F2F learning contributed to their learning. The goal of this pilot was to determine aspects of the course best suited for conversion to online videos that would be made available on the LMS platform. We also wanted to identify the quantity of online video content that would be manageable for a typical semester.

### Questionnaire Survey:

- Q1. Which type of teaching F2F format is more effective in your learning?
- Q2. Which type of video does contribute more to your learning?
- Q3. How many videos are sufficient for a 12-week course?
- Q4. Which one of the following online material structure formats do you find more engaging?
- Q5. Do you find the need for discussing material with someone?

The questionnaire survey was conducted using Google Forms and restricted to students from our programme. The survey itself was anonymous and students across four engineering programmes were invited to participate. All students were studying the second trimester of the first year in 2020. Eighty-eight students responded and the results are reported in the next section.

### Student Engagement Model

To identify what indicators (ways to measure) and facilitators (aspects of online material) enhance engagement, we use a modified version of the model proposed in (Manwaring et al.,

2017). The model by Manwaring et al., (2017) has three categories of engagement facilitators:

1. Individual level (student) represents the type of personal qualities that students bring to instructional experiences. We relate this facilitator to the physiological need of “Competence”. This facilitator measures individual confidence, which is related to the need to produce desired outcomes and to experience mastery.
2. Institutional design (instructor) represents the course design elements the instructor brings to the learning experience, e.g., the number of choice students had in the learning activity. This facilitator is related to the psychological need of “Autonomy”, e.g., in our study is related to the choice provided how the online material is organised.
3. Student perception measures how the student is experiencing the learning activity. One of the characteristics of this category is related to the psychological need of “Relatedness”. In our study, we relate this to the need to feel connected to others.

The modified model for this study is depicted in Figure 3. Table 1 shows the list of the questions we proposed that associated with the facilitators.

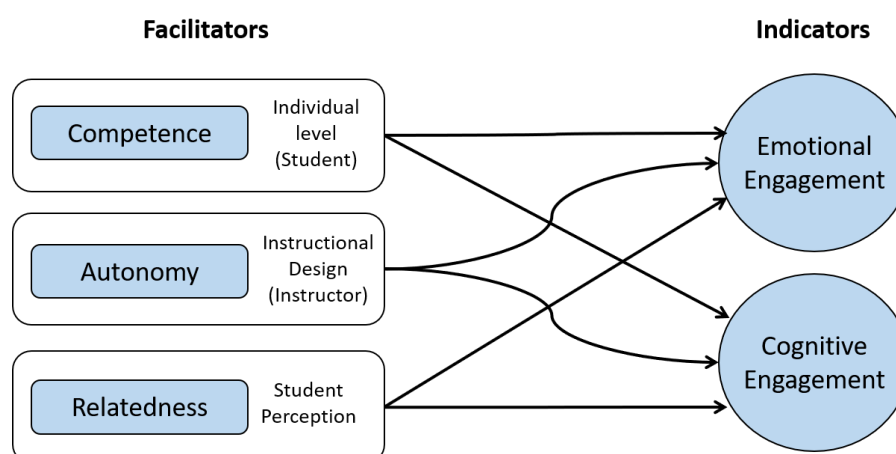


Figure 3: Modified Version of the Student Engagement Model by Manwaring Et Al., (2017).

Table 1: Facilitators and Questions of the Modified Student Engagement Model.

Facilitators	Question
Competence	Q1, “Which type of teaching F2F format is more effective in your learning?” Q2 Which type of video does contribute more to your learning?
Autonomy	Q3 How many videos are sufficient for a 12-week course? Q4 Which one of the following online material structure formats do you find more engaging?
Relatedness	Q5 Do you find the need for discussing material with someone?

## Results

Figure 4 shows the responses to question Q1, “Which type of teaching F2F format is more effective in your learning?”

Overwhelming majority of students identified problem-based tutorials as the most effective format for face-to-face teaching. The second best option that they identified was didactic lectures.



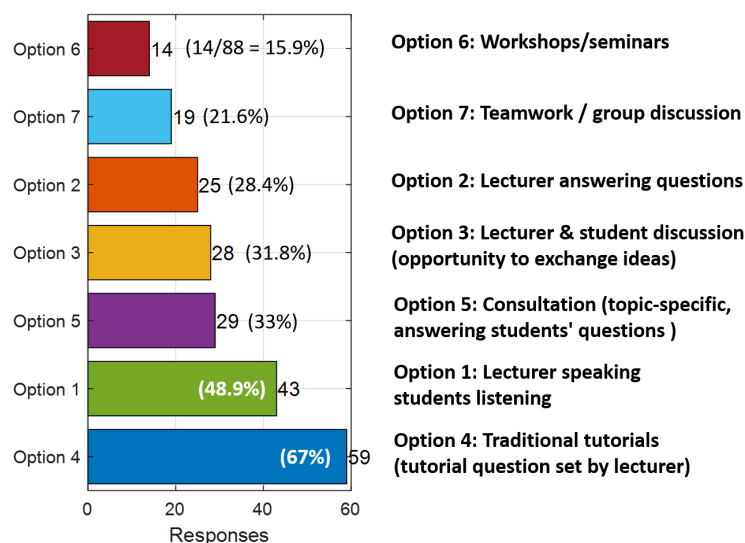


Figure 4: Q1 Which Type of Teaching F2F Format Is More Effective in Your Learning?

Figure 5 shows that 89.5% of the students find that recordings of problem-solving tutorials contributed to their learning. Video recordings of the solution were slightly preferred in comparison with audio recordings over power point. On the contrary, from a student's perspective, videos of lectures or videos of supplementary lectures have the least contribution to their learning.

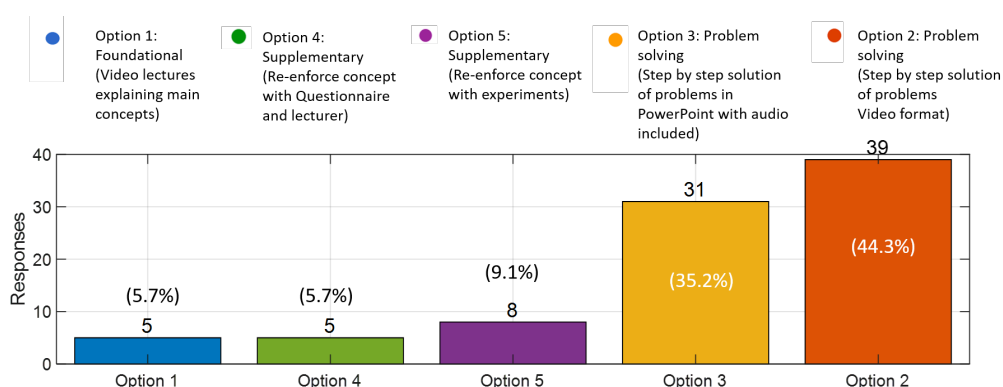


Figure 5: Q3 Which Type of Video Does Contribute More to Your Learning?

Figure 6 shows that 52.3% of the students consider that between 10 to 50 videos of tutorials or lectures are sufficient for a 12-week course.

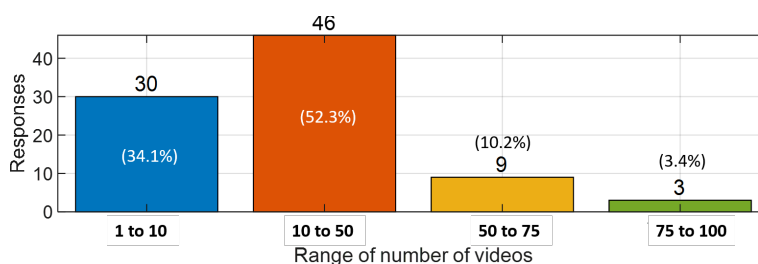


Figure 6: Q2 How Many Videos Are Sufficient for a 12-Week Course?

In Figure 7, from the student's perspective, it can be seen that 45.5% prefer that online material is organised in week-by-week sections.

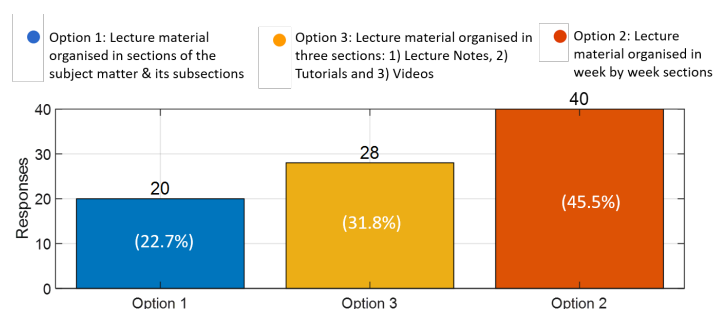


Figure 7: Q4 Which One of the Following Online Material Structure Formats Do You Find More Engaging?

In Figure 8, students responded that 65.9% of them needed to discuss the material with their classmates, and almost 30% needed to discuss the material with the lecturer, highlighting the need for incorporating opportunities for dialogue with lecturers and colleagues.

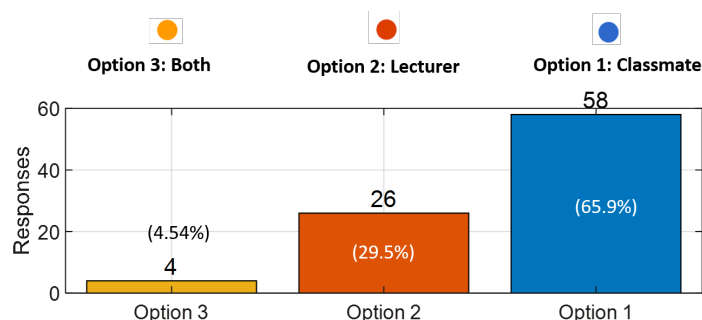


Figure 8: Q5 Do You Find the Need for Discussing Material with Someone?

## Discussion

After examining the response to the questionnaire or the learners' preferences, we identify that the students perceive both F2F and recording of problem-solving as contributors to their learning. We interpret this as a facilitator to provide students with the opportunity to fulfil the need to produce desired outcomes and to experience mastery (Competence). Online lectures by comparison are least preferred by students as the platform for learning and hence would be least suited to conversion to online learning. Interestingly, students rated F2F didactic lectures more favourably (Figure 4). Students responded that online material organised in week-by-week section with 10 to 50 videos of tutorials or lectures. Finally, students expressed the need to discuss coursework both with lecturers and other classmates, which could serve both as the means to achieving competence, and the psychological need to be connected to others (relatedness). Online platforms have the potential to facilitate this interaction and suggest more effort be channelled towards the creation of resources that allow students and lecturers to communicate. The findings and their relationship to the modified student engagement model (Figure 3) are summarised in Table2 below.

Table 2: Summary of Results

Facilitator	Question	Response with majority
Competence	Q1, “Which type of teaching F2F format is more effective in your learning?” Q2 Which type of video does contribute more to your learning?	F2F Problem-based tutorials and Recordings of problem-solving tutorials contribute to their learning followed by didactic lecturing.
Autonomy	Q3 How many videos are sufficient for a 12-week course? Q4 Which one of the following online material structure formats do you find more engaging?	Between 10 to 50 videos of tutorials or lectures are sufficient for a 12-week course. Online material organised in Week-by-week sections.
Relatedness	Q5 Do you find the need for discussing material with someone?	The majority finds the need to discuss the material with classmates followed by the need to discuss it with the Lecturer.

These preliminary results identified some potential facilitators and will provide guidance for further research on identifying more facilitators or learners' preferences that are best received through online sources.

Limitations to this approach include the caveat the students' perception of the utility of each mode of teaching (e.g., lectures versus seminars) may not directly compare with the actual utility. For example, students who do not prefer to go to a workshop, or to a group discussion, they may still learn important skills and gain insight from the session that contributes to their cognitive engagement overall. This aspect of learning needs to be explored with serial questionnaires and performance indices in future work. The relatedness facilitator (social processed) identified in this work needs further investigation, as pointed out by Manwaring et al., (2017), it has potential to impact in both cognitive and emotional engagement. In this work, based on previous research mentioned in the introduction, we assume that the facilitators investigated here (Table 2) have an impact on student engagement. However, to find the correlations between facilitators and student engagement indicators, statistical validation needs to be conducted in future research.

## Conclusion

The results presented here suggest that when designing blended courses, problem-based tutorials are preferred by students in comparison with didactic lectures. Our findings identify recorded video tutorials in combination with F2F lectures as a powerful tool to enhance student satisfaction and engagement.

Future work will address the limitations of the current approach. It is worth mentioning that this research is a pilot study and we have presented preliminary results only, the intent is to re-evaluate the approach to further identify more learners' preferences (facilitators) that impact student engagement in online and blended learning environments.

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**Contact email:** [arturo.molina-cristobal@glasgow.ac.uk](mailto:arturo.molina-cristobal@glasgow.ac.uk)









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Sakae 1-16-26-201  
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